Unit 17 Denmore Industrial Estate, Denmore Road, Bridge of Don, Aberdeen AB23 8JW

User Manual
Telescopic Lubricator
113-2486-HV0

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Revision History

Issue, Release Date	Description
Rev A, 10 Feb 09	Initial Issue
Rev B, 16 Oct 09	Change of direction for Dog Nut operation

Safety

WARNING: Trapped air requires considerable time to compress and when it is compressed is highly dangerous. It has enough stored energy to separate parts with considerable force.

All pressure equipment has a particular pressure rating and care must be taken to ensure that no item is used in a situation that may cause its working pressure to be exceeded.

All personnel involved in pressure testing must be formally trained, competent and utilising the appropriate PPE.

Never attempt to retract the dogs unless the weight of the Housing is safely supported

Ensure the identification band/plate is fitted and is displaying the correct information as per the Tag Sheet/Index

This equipment and the equipment it is attached to is heavy never position yourself below a suspended load

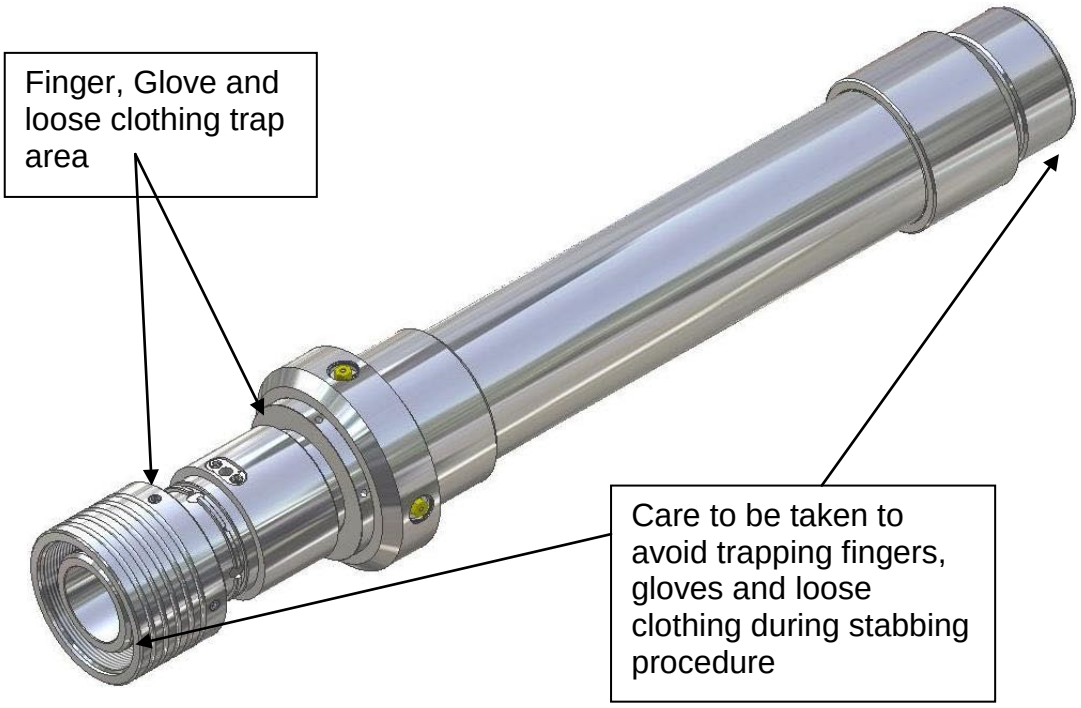

Finger, Glove and loose clothing trap area
Care to be taken to avoid trapping fingers, gloves and loose clothing during stabbing procedure

Figure 1: Lubricator Safety

1 Introduction

1.1 General

The Phuel Telescopic Lubricator is designed to be used when a non standard lubricator is required or when lubricators of differing lengths are required for multiple jobs.

This user manual serves as an introduction to the equipment and contains the relevant specifications, operation, planning and maintenance instructions, parts list and drawings.

1.2 Product Identification

Phuel products are identified by a unique serial number that facilitates full product traceability. Each product is supplied with a documentation pack that contains product certification and material/inspection reports. The serial number is always etched on the surface of the product but can sometimes be difficult to find or read after painting. A customer identification number is also included to allow the customer to track the asset in their system.

A stainless steel band secures the nameplate tag that is stamped with the information shown below. This tag should be located in the first instance to ensure that this manual refers to the correct equipment.

PHUEL OIL TOOLS LTD
DESCRIPTION & SIZE
CUSTOMER ID No
PHUEL ID No 06-XXX-XX
MWP & SERVICE
TEST DATE

2 Technical Specification

Part Number	113-2486-HV0	
Connection	9 – 4 Otis Type Connection ½''NPT	
Maximum Working Pressure (MWP)	10,000 Psi	
Design Test Pressure	15,000 Psi	
Service	H2S	
Weight	983lbs/445.88kg	
	Fully Retracted	Fully Extended
Overall Length	75.37”/1.91m	111.41”/2.83m
Make up Length	71.78”/1.82m	107.82”/2.74m
Inner Diameter	5.13”/0.13m	

Table 1:Technical Data

Figure 2: Telescopic Lubricator Retracted

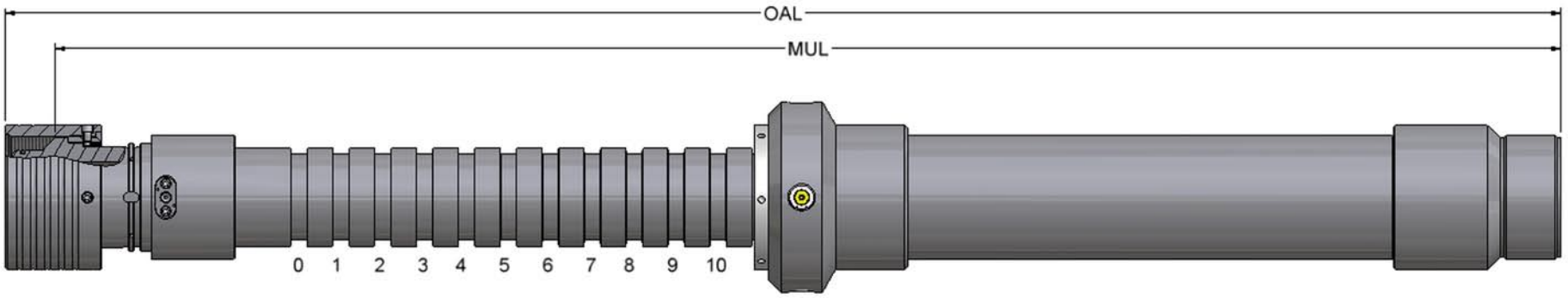


Figure 3: Telescopic Lubricator Extended

Align Groove	0	1	2	3	4	5	6	7	8	9	10	11
Set Groove	1	2	3	4	5	6	7	8	9	10	11	12
MUL (m)	1.900	1.976	2.052	2.129	2.205	2.281	2.357	2.433	2.510	2.586	2.662	2.738
OAL (m)	1.990	2.066	2.142	2.219	2.295	2.371	2.447	2.523	2.600	2.676	2.752	2.828

Table 2: Setting Up Guide

3 Technical Description

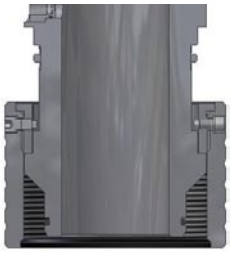
3.1 Lubricator

3.2 Collar Safe-Lok

The safe collar lock is designed to provide safe handling of the union collars. In addition it can be used to prevent accidental back off of the collar. The following shows the sequence for correct operation.

3.2.1 Preparing the Safe-Lok Collar

After removing the thread protector the collar will be set in the lower position and must be moved to the high position before making up the connection.



With both hands raise the collar ensuring the Stop Pins go through the gaps in the raised rim

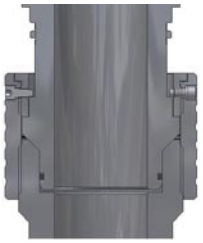
Rotate the collar through 90° and gently lower onto the raised rim. Ensure collar rests into the grooved area

3.2.2 Making up the Safe-Lok Collar

Lift and stab the pin into the mating box and check that there are no signs of damage to the o-ring (caused by being misaligned while stabbing in).

With both hands raise the collar clear of the grooved area on the raised rim and rotate through 90°. Lower the collar until it reaches the top of the threads. Turn the collar anticlockwise until the start of the thread is found and then start turning clockwise to make up the collar to the box thread. When almost made up fully release the plungers from the locked open position.

Tighten the collar down.



3.2.3 Breaking the Safe-Lok Collar

Unscrew the collar completely

Lift the collar up, ensure the stop pins go through the gaps in the raised rim. Rotate the collar 90° and lower gently so that the pins rest in the grooved portion of the raised rim.

The connection can now be separated without any risk of dropping the collar.

3.3 Test Port Saver Sub

The saver sub provides the ability to change a damaged pressure fitting without repairing or replacing a major component. The saver sub is held in place by two socket head cap screws and is sealed by means of an o-ring.

The Saver sub can be replaced with a blank version to avoid the need to fit a pressure blanking plug that would otherwise protrude from Riser assembly.

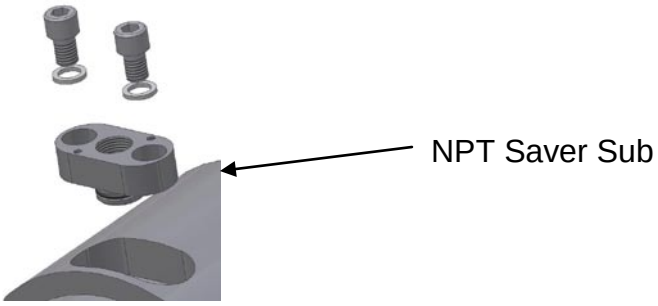


Figure 4 : NPT Saver Sub

4 Operation

All operations to be carried out by suitably qualified and competent personnel

4.1 Lifting

Thread protectors should always be fitted when lifting or moving the riser.

4.1.1 Vertical

The Riser should be lifted with a suitable lifting clamp or cap that is rated for the total lifting load. (Follow the operating procedures for the clamp or cap being used.)

If practical leave the thread protectors fitted until ready to make up the connections.

4.1.2 Horizontal

Suitable slings can be wrapped around either end of the riser to allow horizontal lifting for means of transportation or fitting. Always pay attention to the centre of gravity and do not continue to lift if the lubricator is not sitting horizontal as it might slip through the slings.

4.2 Setting Up Riser (to correct length)

4.2.1 Vertical Position [Recommended]

- Set up the Lubricator in a vertical position secured to a test stump with a lift cap attached to the top thread
- Take the weight of the Outer Housing – there is some play within the grooves so it is possible to see when the weight is taken by the crane by moving slowly up and down – stop in the mid travel position.
- Unscrew the Locking Ring (9) 1-1/4 to 1-1/2 full turns – It is important that it is within this as this item is used to align the groove later
- Remove each of the dogs by turning the Dog Nut (12) anticlockwise. It is common for the driver to be a little stuck at first and the box spanner can be used to dislodge the mechanism. **DO NOT FORCE THE DRIVER** as this can cause the roll pin to shear. If the dogs cannot be moved by hand then it is likely that the weight is still on the dogs. Adjust the crane until all dogs can be fully retracted by hand.
- Lift the crane (or lower) to the desired position (see Table above)
- The lower face of the Locking Ring should be used to help position the dogs correctly. Adjust the crane until the face is level with the lower

edge of the groove below where you want to set the dogs (see Table 2: Setting Up Guide.
- Engage the dogs by turning the Dog Nut (12) clockwise. Make sure that all four fully engage by hand – if they become stuck then it is an indication that the position is not correct – adjust accordingly until it is possible to make up all four dogs. The Dog Driver pin should now be flush with the Nut (12)
- Make up the Locking Ring (9) again and ensure that it makes up fully with the Dog Housing (3)
- The position is now set and the weight can now be relaxed from the crane.

4.2.2 Horizontal Position

- Set up the Lubricator in a horizontal position with the Housing fixed in a vice and the weight of the Union Mandrel supported with roller stands.
- Unscrew the Locking Ring (9) 1-1/4 to 1-1/2 full turns – It is important that it is within this as this item is used to align the groove later
- Remove each of the dogs by turning the Dog Nut (12) anticlockwise. It is common for the driver to be a little stuck at first and the box spanner can be used to dislodge the mechanism. **DO NOT FORCE THE DRIVER** as this can cause the roll pin to shear. If the dogs cannot be moved by hand then it is likely that the weight is still on the dogs. Adjust the stroke of the Mandrel by knocking on the end with a hammer until all dogs can be fully retracted by hand.
- Stroke out to the desire position using a rotation and sideways movement with the pipe wrench until the desired stroke is achieved.
- The lower face of the Locking Ring should be used to help position the dogs correctly. Adjust the stroke until the face is level with the lower edge of the groove below where you want to set the dogs (see Table 2: Setting Up Guide.
- Engage the dogs by turning the Dog Nut (12) clockwise. Make sure that all four fully engage by hand – if they become stuck then it is an indication that the position is not correct – adjust accordingly until it is possible to make up all four dogs. The Dog Driver pin should now be flush with the Nut (12)
- Make up the Locking Ring (9) again and ensure that it makes up fully with the Dog Housing (3)
- The position is now set and the Lubricator is ready to use.

4.3 Making Up the Riser

- With the riser hanging vertically above the mating connection, remove the thread protectors of both ends.
- Set the Safe-lok collar to the high position ready for stabbing in.

- Inspect the o-ring for any signs of damage and apply grease if required
- Inspect the mating bore and thread for any signs of damage or debris and clean and grease if necessary
- Lower the connection and centralise to ensure that the o-ring is not loaded on one side. Ensure that the connection has stabbed fully home and that there are no signs of o-ring debris.
- Release the Safe-lok collar and make up the threads until the Safe-lok engages in the lower groove.
- Store the thread protectors in a safe place for use later.

4.4 Breaking the connection

- Ensure that all pressure is bled off. The free movement of the collar is an indication of this.
- Unscrew the collar fully
- Lift the collar and ensure the Stop Pins pass through the gaps in the raised rim rotate the collar 90° and lower gently into the grooved area of the rim. Release the weight of the collar and ensure that it is supported correctly.
- Lift up the riser to break the connection. Visually inspect the o-ring and male end to make sure that no damage has occurred. Report if necessary.
- Fit the thread protector to the bottom of the riser at this time to prevent damage when moving. To do this the Safe-Lok collar must be set to the low position. Take care to support the weight of the collar before releasing the plungers.
- Fit the thread protector to the other thread unless a lifting cap is being used.

4.5 Replacing the Saver Sub

It is not expected that the save sub would need to be replaced during normal operations but if damage occurs to a pressure fitting or a leak is found during pressure testing then this procedure should be followed.

- Ensure that the pressure is bled off.
- Do not remove the pressure fittings at this time as they can be used to provide grip to remove the plug.
- Remove the two socket head cap screws and lock washers. (If they appear unusually tight or difficult to move re-check that the pressure has been removed).
- Grip the pressure fitting and pull out the saver sub with a pulling and rocking motion. If the pressure fitting has been removed already then two ¼-20 UNC screws (not supplied) can be used to jack out the sub.
- Inspect the o-ring for signs of damage and replace if necessary

- Inspect the seal bore for signs of damage and report if necessary
- If required, remove the pressure fitting – clean and inspect the pressure port.
- To re-fit the sub, first apply grease to the o-ring and seal bore.
- Push the sub into the bore by hand as far as possible, ensuring that the part is centralised in the bore.
- Fit the screws and washers and tighten to drive the o-ring into the bore. Make up each screw equally to ensure that the sub does not become twisted.
- Fully tighten the screws.

4.6 Pre Job

- Ensure thread protectors are fitted
- Check maintenance record sheet and ensure the equipment has been maintained by competent personnel
- Check all certification is in date
- Confirm information band is fitted and correct
- Ensure equipment is suitable for the maximum working pressures and services involved
- Ensure ‘O’ ring (27) is seated correctly and there are no signs of damage
- Ensure threads are clean
- Inspect for signs of damage
- Pressure test to maximum working pressure
- Carry out a collar lock test and ensure correct operation
- Ensure all connections are tight and that the test port is tightly fitted

4.7 During Job

- Ensure collar lock has operated correctly and the collar is locked in position
- Avoid excessive movement

4.8 Post Job

- Inspect for signs of damage
- Ensure threads are clean
- Ensure thread protectors are fitted
- Ensure that any exposed grooves on the Union Mandrel (2) are well lubricated with grease
- If practical fully extend the Lubricator – clean and grease all the grooves and the lower and set in the lowest position.

5 Maintenance

All maintenance to be carried out by suitably qualified and competent personnel

5.1 Introduction

Regular maintenance of the equipment using Phuel redress kits or Phuel approved parts is essential to its continued safe operation. Ensure that the pre and post job operating procedures are followed and that maintenance records are kept.

5.2 Schedule

The maintenance schedule may be governed by international or company standards and the following is considered to be the minimum requirements.

5.2.1 Pre & Post Job

Refer to Section 4.6 and Section 4.8 for details

5.2.2 Yearly

- Disassemble Lubricator (see section 5.5.1) clean and degrease all components
- Inspect the condition of all sealing surfaces and surface coatings
- Re-coat threads and sealing surfaces if necessary. If in doubt contact Phuel Oil Tools Ltd
- Replace all elastomeric seals with items from redress kit (Table 5)
- Regrease components
- Re-assemble (see section 5.5.2)
- Pressure test to maximum working pressure in accordance to testing procedure (see section 6)
- Inspect paint work and repair as necessary

5.2.3 Five Yearly

- Yearly Maintenance (plus the following)
- Carry out surface NDE on all component threads and damaged surfaces
- Pressure test to maximum working pressure (witnessed by certifying authority where applicable)

5.3 Safety

- Many of the components are heavy and should not be lifted without lifting aids.
- Ensure all pressure testing is carried out in the appropriate testing area by suitably qualified personnel.
- Wear appropriate personal protective equipment.
- Do not over exert yourself while using torque wrenches. Use appropriate mechanical advantages when available.
- Ensure that all tools and equipment are in good condition and are suitable for the intended use.
- Clear up any fluid spills immediately to avoid slips.

5.4 Tools

The following tools/equipment is required:

- Test Stump
- Lift/Test Cap
- Crane or other suitable lifting device
- Pipe wrench suitable for 10.5” diameter (non marking preferred)
- 24mm Box Spanner
- 3/8 Hex Key

5.5 Redress Procedure

5.5.1 Dis-assembly

- Attach Lift Cap to Top Sub (4) and support with crane. Back up on the Outer Housing (1) and then turn the Dog Housing (3) to break the connection - while making height adjustments with the crane to support the weight. When free lift the Outer Housing off the Union Mandel (2)
- Remove the top sub (4) from the Outer Housing (1)
- Remove Scrapers (15) and T-Seals (16) from the Union Mandel (2)
- Remove Bottom Sub (5) from Union Mandel (2)
- Remove Save Sub Port (10) from Bottom Sub (5) and remove the O-Ring (24)
- Remove Stop Pins (19) and washers (20) from collar, remove the Split Ring (7) and remove collar from the Bottom Sub (5)
- Mount the Union Mandrel horizontally in a vice and remove the Locking Ring (9) and screw out Dogs (8) by turning the Drive Nut (12) clockwise. Slide Dog Housing (3) off Union Mandel (2)
- From each of the 4 holes on the dog housing remove the Circlip (18) then extract the Spacer (11) and Thrust Bearing assembly(17) by unscrewing the Drive Nut (12) from the Dog Driver (13)

- Extract the Dog (8) and Dog Driver (13) from inside the Dog Housing (3) then remove the remaining Thrust Bearing assembly (17) and Debris Washer (14)
- If necessary, carefully remove the Roll Pin (29) from each of the Dogs (8) and separate the Dogs (8) from the Dog Driver (13)
- Remove and Discard all Elastomers

5.5.2 Assembly

5.5.2.1 Dog Housing Sub-Assembly

- Align the hole at the bottom of the Dog Driver (13) with hole of the Dog (8).
- Carefully knock in Roll Pin (29) through both holes, ensure that the end of the pin is flush with the Dog (8). Repeat for the other three Dogs (8).
- Position all four Dogs (8) with assembled Dog Drivers (13) in the Dog Housing (3), directing the ends of the Dog Driver (13) though the holes.
- Insert Thrust Bearing (17) and Debris Washer (14) into the hole, around the Dog Driver (13).
- Screw the Drive Nut (12) onto the Dog Driver (13), and then place Thrust Bearing (17) around the Drive Nut (12).
- Assemble O-Ring (22) and (23) to Spacer (11), and then push into the hole, around Drive Nut (12).
- Insert Circlip (18) into groove.
- Repeat steps four to seven with the remaining three holes.
- Turn Drive Nut (12) clockwise to retract the Dogs (8), and then assemble Locking Ring (9), **DO NOT TIGHTEN**
- Sub-assembly is complete, set to one side.

5.5.2.2 Bottom Sub Assembly

- Slide Collar (6) over Bottom Sub (5), and then assemble Split Ring (7) to Collar (6) until flush – back off to align the holes
- Insert Stop Pins (19) and Washers (20) into Collar (6) and Split Ring (7)
- Insert O-Ring (24) to Saver Sub Port (10).
- Insert Saver Sub Port (10) into Bottom Sub (5) with Socket Head Cap Screw (21) and washers (20).
- Assemble O-Ring (27) to Bottom Sub (5) and lightly grease.
- Sub-assembly is complete, set to one side.

5.5.2.3 Final Assembly

- Slide Dog Housing (3) over the Union Mandel (2) with the Locking Ring (9) at the bottom.

- Align the bottom face of the Locking Ring with the lower edge of the lowermost groove (a higher setting can be used if required). Screw the Dogs (8) into the groove up by turning the Drive Nut (12) anti-clockwise, and then tighten Locking Ring (9) fully to lock the dogs. Do not force the dogs at this point – it should be possible to drive the dogs by hand – if more force is required the reposition the dog housing.
- Insert O-Ring (26) to Phuel thread end of Union Mandel (2) and lightly grease.
- Make up the Bottom Sub (5) to the Inner Mandrel and tighten with pipe wrench to activate metal seal.
- Ensure that the collar is set in the upper lock position. Lift the Union Mandrel from the vice and stab into the test stump – make up the collar
- Insert T-Seals + Back-ups (16) and Scrapers (15) to other end of Union Mandel (2) and lightly grease. Ensure that the sharp edge of the lower scraper is at the bottom and the edge of the upper one is at the top.
- Insert O-Ring (26) to Outer Housing (1) and lightly grease.
- Assemble Top Sub (4) to Outer Housing (1). Make up with a pipe wrench to activate the metal seal
- Attach the Lift Cap into Top Sub (4) and lift with Forklift / Crane
- Allow the Outer Housing (1) to slide over Union Mandel (2), once thread reaches Dog Housing (3), turn the Dog Housing (3) to make up the thread whilst gradually lowering the Forklift / Crane.
- Assembly complete. Refer to Operation section for details on how to set to the desired height.

5.6 Maintenance Record Sheet

Date Performed	Type of Maintenance	Performed By	Verified By	Comments

Table 3: Maintenance Record

6 Testing

All testing is to be carried out in the designated test area and by suitably qualified and competent personnel.

WARNING: Trapped air requires considerable time to compress and when it is compressed is highly dangerous. It has enough stored energy to separate parts with considerable force.

- Fit appropriate test caps and blanking plugs
- Fill with testing fluid bleeding off any air within the system
- Apply a pressure of 500 psi and ensure pressure holds for a minimum of 10 minutes
- Increase pressure to 10,000 psi (Maximum Working Pressure), allow to stabilise and maintain this pressure until it is evident there are no apparent leaks.
- Bleed off pressure, drain test fluid and dry
- Remove test caps
- Apply coating of de-watering solution to protect the bore and threads
- Fit thread protectors

On completion of all maintenance ensure the maintenance record sheet (Para 5.6) is completed

7 Parts List and Drawings

Item Number	Part Number	Quantity	Description
1	113-2444-480	1	OUTER HOUSING (7.25" BORE)
2	113-2468-480	1	UNION MANDEL
3	113-2465-480	1	DOG HOUSING
4	113-2466-480	1	TOP SUB
5	110-2289-480	1	BOTTOM SUB
6	110-2053-480	1	COLLAR 9-4 (SPLIT TYPE)
7	110-2054-480	1	SPLIT RING (9-4)
8	113-2463-480	1	DOGS
9	113-2464-480	1	LOCKING RING
10	145-2176-480	1	SAVER SUB PORT
11	113-2489-N66	4	SPACER
12	113-2469-PLA	4	DRIVE NUT
13	113-2470-STL	4	DOG DRIVER
14	113-2490-PU8	4	DEBRIS WASHER
15	113-2467-PEK	2	SCRAPER
16	802-2471-V80	2	PISTON T-SEAL (7.250 BORE)
17	113-2487-STL	8	THRUST BEARING (INA-535 - TC2031)
18	113-2503-STL	16	BEARING WASHER (INA-535 - TWA2031)
19	110-2329-3A4	4	STOP PIN
20	WNL-0580-STL	6	Nord Lock Washer (M12)
21	SHC-0583-3A4	2	Soc Hd Cap Size 1/2 Length 0.75 in
22	801-0024-V90	4	O-Ring - B.S Size 024
23	801-0031-V90	4	O-Ring - B.S Size 031
24	801-0119-V90	1	O-Ring - B.S Size 119
25	801-0361-V90	1	O-Ring - B.S Size 361
26	801-0369-V90	2	O-Ring - B.S Size 369
27	801-0438-V90	1	O-Ring - B.S Size 438
28	113-2488-STL	4	CIRCLIP (DHO-50)
29	113-2545-STL	4	ROLL PIN (SPLIT) 1/8 X 1." LONG
100	910-2155-N66	1	9-4 ACME MALE PROTECTOR
101	910-2156-N66	1	9-4 ACME FEMALE PROTECTOR

Table 4: Parts List

Note: Thread Protectors (item100 and 101) not shown in assembly drawing Figure 5

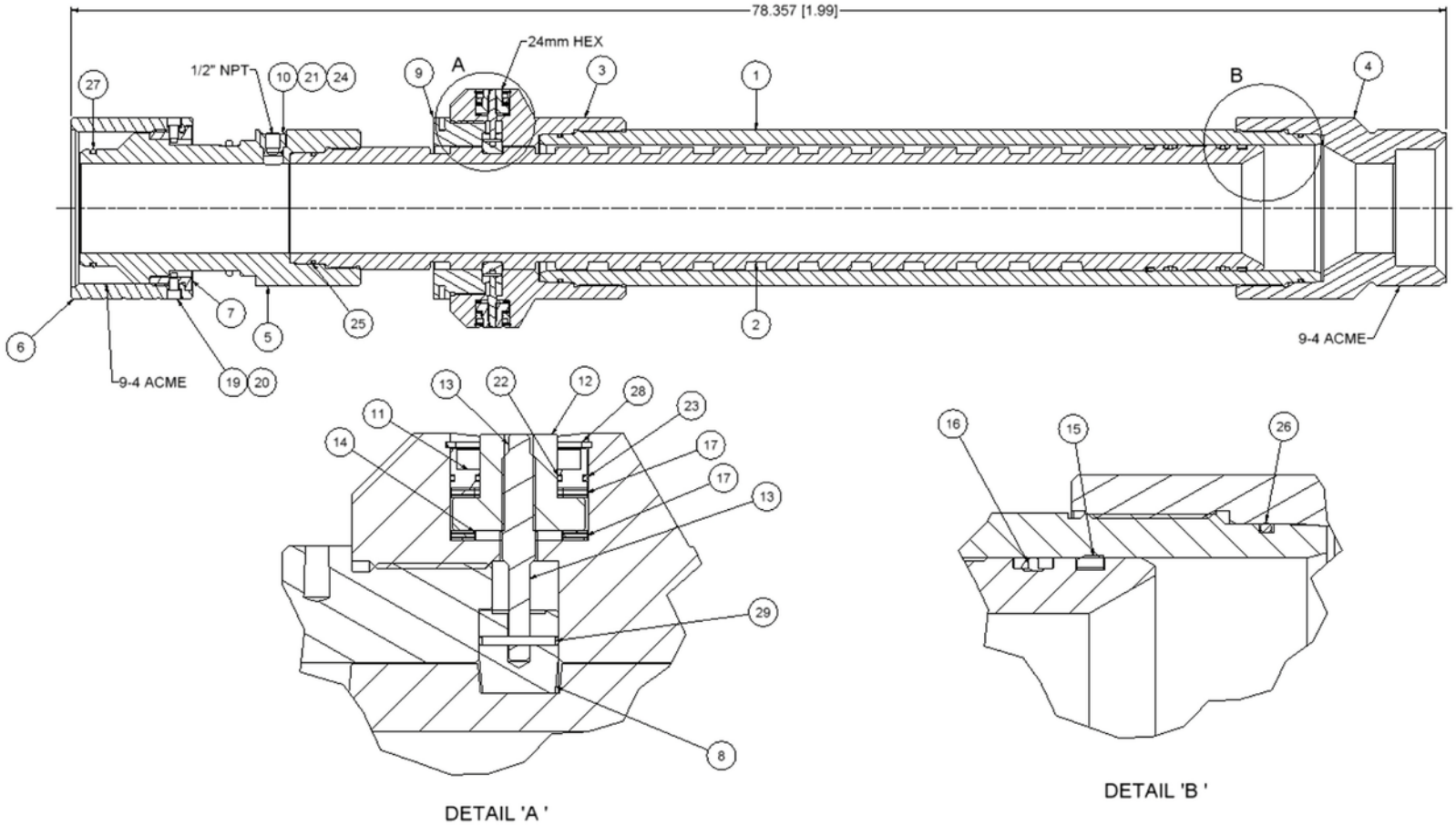


Figure 5: Telescopic Lubricator Assembly

8 Spares

Use only spares supplied or approved by Phuel Oil Tools Ltd.

It is recommended that sufficient quantities of the following spares be maintained to ensure that the equipment is always available when required.

Elastomeric spares are supplied in Viton material as standard. Many other materials are available please specify when ordering.

Part No	Qty	Description	Comments
801-0024-V90	4	O-Ring - B.S Size 024	
801-0031-V90	4	O-Ring - B.S Size 031	
801-0119-V90	1	O-Ring - B.S Size 119	
801-0361-V90	1	O-Ring - B.S Size 361	
801-0369-V90	2	O-Ring - B.S Size 369	
801-0438-V90	1	O-Ring - B.S Size 438	
802-2471-V80	2	PISTON T-SEAL (7.250 BORE)	

Table 5 : Redress Kit Part No RDK-2486-HV0

8.1.1 Individual Items

Individual items may be ordered as required using the part number specified

Note: O-Rings conform to industry standards and may be substituted with those from other suppliers -– **at the sole risk of the user**.

8.1.2 Supporting Equipment

The following test fixtures are available for order directly from Phuel Oil Tools Ltd

Part No.	Item Description	Comments
205-2105-480	Blank Test Sub	
111-2493-HV0	Lubricator Manifold Valve	

Table 6 : Supporting Equipment